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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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November 5, 1990

TO: Wayne Hedberg, Permit Supervisor

FROM: Tony Gallegos, Reclamation Engineer aaj

RE: Review of Revised Notice of Intention, Tenneco Minerals, Tenneco Goldstrike Project, M/053/005, Washington County, Utah

I have completed my review of the Tenneco Minerals submission. The submission was reviewed as a stand-alone document which superseded any prior submissions with regard to the Goldstrike Project. My comments are presented below with reference to the specific rules.

R613-004-105 Maps, Drawings and Photographs.

Surface facilities shown on drawing GS-008 Project Development 1992, are the same as those shown on drawing GS-005 Project Development 1990, yet the plan states that one solution pond was enlarged and a new solution pond was added. Neither drawing contains labels for individual facility structures. If this document is to stand alone a more accurate and descriptive drawing of the 1992 facilities layout should be submitted.

The document makes reference to the West Hassayampa Pit and the Peace Mine Pit, but neither pit is shown on any of the drawings in this submission. In order for this document to stand-alone these pits should be described verbally and/or graphically.

R613-004-106 Operation Plan.

The document states that the combined capacity of the pregnant pond, barren pond and fresh water pond is available for storm inflow by placing 24" spillways between ponds (section 3.4). It is unclear whether or not this placement must be done manually or if these spillways are already in place. The overflow system should function without human intervention. The operator should clarify this point or modify the overflow system to be automatic.

R613-004-109 Impact Assessment.

Safety berms around the open pits are mentioned in the document, but no berm design or location descriptions are given. The construction of these berms was not addressed in the reclamation cost estimate, implying that they are part of the operation plan. The operator should clarify this point and provide design and location drawings for the safety berms.

The Padre and Basin Pits will not be backfilled and will consequently leave highwalls remaining. No verbal description of these highwalls was included in the document. The operator should provide a description of these highwalls in order for the Division to adequately assess their impact.

R613-004-110 Reclamation Plan.

Reclamation of the Goldtown Pit was not specifically addressed in the document. Reclamation of this area was indirectly mentioned in connection with the Contractor Staging Area, but it is unclear whether this will adequately reclaim the pit. The operator should clarify how the pit will be reclaimed or whether or not the reclamation of the Staging Area will totally reclaim the pit area.

Reclamation of the Sediment Dam via revegetation was not mentioned. If the operator wishes this structure to remain after final reclamation, revegetation steps should be taken to insure the long-term stability of this dam. The operator should address this in the reclamation plan.

In Section 6.3 of the submission, the operator proposes to flush the heap leach pad with water until the cyanide concentration in the runoff is < 5ppm according to the BWPC, then drain the heap and allowed it to dry out. The time frame for this decommissioning is given in the reclamation cost estimate as 6-months. This time frame may not be realistic. The operator should provide information/calculations to support this estimated time frame and define "drained" and "dry" in quantifiable terms with respect to the leach pad system.

Reclamation of the topsoil stockpile areas after the topsoil is removed was not addressed in the submission. Portions of the Main Pit, Sediment Dam and Padre Pit stockpiles were included within the disturbed area boundary, but not the entire stockpile areas. These areas encompass an estimated 4 acres. The operator should include revegetation of these areas in the reclamation plan since they will be disturbed.

The Reclamation Plan shows the estimated total volume of salvaged topsoil to be 193,000 cubic yards which will be placed over 220 acres of disturbance resulting in a topsoil layer approximately 6 inches deep. A 6 inch layer over the entire disturbed area may not result in good revegetation success. Areas of critical revegetation may show greater success by being covered with at least 12 inches of topsoil, however, this would require leaving other areas without topsoil cover. The operator may wish to consider prioritizing revegetation areas when distributing the available topsoil. Soils in some areas of the project may be amenable to revegetation without topsoil, provided soil amendments and treatments are used. The Division will need to coordinate with the operator to decide whether prioritizing areas is an acceptable option.

Section 6.7 of the Reclamation Plan states that after the topsoil is placed, it will be ripped to a depth of 12 inches. Surety Section 8.5 states that the topsoil will be ripped to a depth of 6 inches. The operator should clarify which depth will be used. A ripping depth of 12 inches is preferred.

The heap leach is to be neutralized, regraded, covered with 6 inches of topsoil, ripped to 12 inches, fertilized, mulched and seeded. These steps may not be adequate to establish plant growth over the heap leach due to the chemical composition or coarseness of the leached materials (minus 4 inch). Options include the topsoil prioritizing mentioned above or the placement of a barrier medium between the topsoil and the heap.

Also, the Reclamation Plan calls for dozing topsoil over the 2:1, 300 foot long, side slopes of the leach pad foundation (Section 6.6). This may not be a prudent use of the limited topsoil resource. Final reclamation of the heap leach pad may need to be discussed further with the operator.

R613-004-112 Variance.

The operator has requested a variance to Rule R613-004-111-9 to allow four impounding areas to remain after final reclamation. These areas are the Sediment Dam, the Quail Canyon Dam (leach pad foundation dam), the Padre Pit and the Basin Pit. The Quail Canyon Dam must remain in order to maintain structural integrity of the pad and to prevent contact with the heap leach materials, therefore, I agree with this variance. Provided that the Sediment Dam is stabilized by revegetation I would agree with this variance. The Padre and Basin Pits will be the last areas

mined and it would be difficult and costly to modify these pits to be non-impounding, therefore I agree with this variance.

The operator has requested a variance to Rule 613-004-111-6 to allow reclaimed slopes on the southwest side of Hamburg Peak to remain at a 1.5:1 angle. The submission contains no other reference to this area verbally or in the drawings. Until the operator has more clearly identified this area I would withhold my decision on granting a variance.

The operator has requested a variance to Rule 613-004-111-7 to allow highwalls to remain at angles steeper than 45 degrees in the Main, Basin, Hamburg and Padre Pits. These highwalls would have slopes between 50 and 56 degrees. The operator estimates the Main Pit highwall to be 190 feet in height and the Hamburg Pit highwall to be 320 feet in height. Estimates made using drawing GS-008 Project Development 1992, show the Basin Pit highwall with a maximum height of 290 feet and the Padre Pit highwall with a maximum height of 350 feet. These estimates of maximum height are generally limited to a small area of the pits. The operator has performed an assessment of slope stability for the Main, Hamburg, Hassayampa and Padre Pits which concludes that their slope designs are safe and stable. For that reason I would approve granting a variance for the Main, Hamburg and Padre Pit highwalls. The submission contains no reference linking the Basin Pit to the Hassayampa Pit, therefore, I would withhold my decision on granting a variance for the Basin Pit highwalls until the operator can clarify this issue.

R613-004-113 Surety.

The operator's Surety estimate is $933,000 in 1993 dollars. Unit costs in this estimate are based on Tenneco's wage scale and experience with contractors, and the Means Facility Cost Data (1988). Certain portions of the estimate are acceptable, while other portions are lower than Division estimates. Unit costs used in preparing the Division estimate were based on the Rental Rate Blue Book (4/90-9/90) and the Means Site Work Cost Data 1990. The Division estimate was also calculated using a 5-year escalation period instead of 3 years. The Division estimate rounded in 1995 dollars would be $1,051,000 (see attachment for details).

jb
Attachment
MNM053005.2

RECLAMATION ESTIMATE

Tenneco Minerals Company
Goldstrike Mine Washington County
M/053/005 November 7, 1990
Prepared by Utah State Division of Oil, Gas & Mining

Reclamation Details

****Tenneco time estimates & Division unit costs are used in this estimate*
****Means Site Work Cost Data 1990 & Rental Rate Blue Book utilized*
-Generator for decommission of heap leach (6 months)
-Labor for decommission of heap leach (Tenneco estimate)
-Miscellaneous reagents, supplies, vehicles, equip. for decommission
-Regrading Leach Pad #1 & #2, plant & pond area, Padre dump & road
-Ripping ponds to 24", roads, plant, crusher, & contractor sites to 12"
-Removing two culverts 21" x 80' each (Tenneco estimate)
-Hauling and placing topsoil by scrapers, dozers, & water truck
-Seeding, mulching, crimping, fertilizing or hydroseeding (Tenneco estimate)
-Construction supervision during reclamation (Tenneco estimate)

Description	Amount		$/Unit	Cost-$
Generator (Decommission)	6	mo	2,228	13,368
Labor (Decommission)	Tenneco Estimate			193,600
Miscellaneous (Decommission)	Tenneco Estimate			24,000
Regrading	1,126	hr	175.50	197,613
Ripping	118.8	hr	191.55	22,756
Culvert Removal	2	ea	100	200
Topsoiling	431	hr	679.91	293,041
Revegetation	Tenneco Estimate			98350
Supervision	Tenneco Estimate			29600
	SUBTOTAL			872,528
	+ 10% CONTINGENCY			87,253
	SUBTOTAL			959,781
	+ 5 yr ESCALATION(1.84%)			91,610
	TOTAL			1,051,391
	ROUNDED TOTAL IN 1995-$			**$1,051,000**